



STATE OF HAWAII DEPARTMENT OF HEALTH

Facts About Sulfur Mustard (Mustard Gas)

What sulfur mustard is

- Sulfur mustard is a type of chemical warfare agent. These kinds of agents are called vesicants or blistering agents, because they cause blistering of the skin and mucous membranes on contact.
- Sulfur mustard is also known as "mustard gas or mustard agent," or by the military designations H, HD, and HT.
- Sulfur mustard sometimes smells like garlic, onions, or mustard and sometimes has no odor. It can be a vapor (the gaseous form of a liquid), an oily-textured liquid, or a solid.
- Sulfur mustard can be clear to yellow or brown when it is in liquid or solid form.

Where sulfur mustard is found and how it is used

- Sulfur mustard is not found naturally in the environment.
- Sulfur mustard was introduced in World War I as a chemical warfare agent. Until recently, it was available for use in the treatment of a skin condition called psoriasis. Currently, it has no medical use.

How people can be exposed to sulfur mustard

- If sulfur mustard is released into the air as a vapor, people can be exposed through skin contact, eye contact, or breathing. Sulfur mustard vapor can be carried long distances by wind.
- If sulfur mustard is released into water, people can be exposed by drinking the contaminated water or getting it on their skin.
- People can be exposed by coming in contact with liquid sulfur mustard.
- Sulfur mustard can last from one to two days in the environment under average weather conditions and from weeks to months under very cold conditions.
- Sulfur mustard breaks down slowly in the body, so repeated exposure may have a cumulative effect (that is, it can build up in the body).

How sulfur mustard works

- Adverse health effects caused by sulfur mustard depend on the amount people are exposed to, the route of exposure, and the length of time that people are exposed.

- Sulfur mustard is a powerful irritant and blistering agent that damages the skin, eyes, and respiratory (breathing) tract.
- It damages DNA, a vital component of cells in the body.
- Sulfur mustard vapor is heavier than air, so it will settle in low-lying areas.

Immediate signs and symptoms of sulfur mustard exposure

- Exposure to sulfur mustard is usually not fatal. When sulfur mustard was used during World War I, it killed fewer than five percent of the people who were exposed and got medical care.
- People may not know right away that they have been exposed, because sulfur mustard often has no smell or has a smell that might not cause alarm.
- Typically, signs and symptoms do not occur immediately. Depending on the severity of the exposure, symptoms may not occur for two to 24 hours. Some people are more sensitive to sulfur mustard than are other people, and may have symptoms sooner.
- Sulfur mustard can have the following effects on specific parts of the body:
 - *Skin*: redness and itching of the skin may occur two to 48 hours after exposure and change eventually to yellow blistering of the skin.
 - *Eyes*: irritation, pain, swelling, and tearing may occur within three to 12 hours of a mild to moderate exposure. A severe exposure may cause symptoms within one to two hours and may include the symptoms of a mild or moderate exposure plus light sensitivity, severe pain, or blindness (lasting up to 10 days).
 - *Respiratory tract*: runny nose, sneezing, hoarseness, bloody nose, sinus pain, shortness of breath, and cough within 12 to 24 hours of a mild exposure and within two to four hours of a severe exposure.
 - *Digestive tract*: abdominal pain, diarrhea, fever, nausea, and vomiting.

What the long-term health effects may be

- Exposure to sulfur mustard liquid is more likely to produce second- and third-degree burns and later scarring than is exposure to sulfur mustard vapor. Extensive skin burning can be fatal.
- Extensive breathing in of the vapors can cause chronic respiratory disease, repeated respiratory infections, or death.
- Extensive eye exposure can cause permanent blindness.
- Exposure to sulfur mustard may increase a person's risk for lung and respiratory cancer.

How people can protect themselves and what they should do if they are exposed to sulfur mustard

- Because no antidote exists for sulfur mustard exposure, the best thing to do is avoid it. Immediately leave the area where the sulfur mustard was released. Try to find higher ground, because sulfur mustard is heavier than air and will settle in low-lying areas.
- If avoiding sulfur mustard exposure is not possible, rapidly remove the sulfur mustard from the body. Getting the sulfur mustard off as soon as possible after exposure is the only effective way to prevent or decrease tissue damage to the body.

- Quickly remove any clothing that has liquid sulfur mustard on it. If possible, seal the clothing in a plastic bag, and then seal that bag inside a second plastic bag.
- Immediately wash any exposed part of the body (eyes, skin, etc.) thoroughly with plain, clean water. Eyes need to be flushed with water for five to 10 minutes. Do NOT cover eyes with bandages, but do protect them with dark glasses or goggles.
- If someone has ingested sulfur mustard, do NOT induce vomiting. Give the person milk to drink.
- Seek medical attention right away. Dial 911 and explain what has happened.

How sulfur mustard exposure is treated

The most important factor is removing sulfur mustard from the body. Exposure to sulfur mustard is treated by giving the victim supportive medical care to minimize the effects of the exposure. Though no antidote exists for sulfur mustard, exposure is usually not fatal.